

VIII. Taking Care of Water Quality Problems

State and Federal Regulations

Federal and state laws provide a framework for comprehensive water quality protection. Three federal and state regulations provide the foundation for protecting Arizona's water resources:

1. **The federal Clean Water Act** – establishes a national goal to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. This act was amended in 1987 to include state nonpoint source management programs that address reduction of pollution associated with activities that do not have end-of-pipe discharge points and can have discharges that are dispersed over large areas (e.g., agriculture, urban runoff).
2. **The federal Safe Drinking Water Act** -- requires that states develop programs to protect surface and ground water used for public drinking water systems through source water protection programs, and to ensure the delivery of safe water to these public systems.
3. **The Arizona Environmental Quality Act** – gives ADEQ authority to develop state environmental protection programs for both surface and ground water (e.g., Aquifer Protection Permits, drywell registration, Pesticide Contamination Program, installation and remediation of Underground Storage Tanks and ground water monitoring).

This section will discuss the following programs established to identify and mitigate surface water quality problems in Arizona:

- The Nonpoint Source Program,
- Surface Water Monitoring
- The Total Maximum Daily Load Program
- Watershed Management, including volunteer monitoring
- Grants and Outreach Program

Many other water quality protection programs (e.g., permits, compliance and enforcement), also protect and mitigate water quality problems. Information about these programs can be obtained at ADEQ's web site: www.azdeq.gov. The Ground Water Monitoring Program was discussed in Chapter VII.

The Nonpoint Source Program

Early Clean Water Act programs concentrated on controlling point sources of pollution caused by discharges from large municipal and industrial sources. These programs achieved tremendous improvements in both ground water and surface water quality. Despite these accomplishments, much remains to be done to achieve the goals of the Clean Water Act and ensure that the nation's waters are "fishable" and "swimmable." In addition to point sources of pollution, Arizona's water resources continue to be impacted by nonpoint sources of pollution. Nonpoint source pollution is now considered the single largest cause of water pollution throughout the nation.

ADEQ works with federal, state, and local agencies, tribes, nonprofit organizations, the environmental community and local citizens to develop nonpoint source watershed management strategies to reduce nonpoint source pollution that degrades water quality. These management strategies rely on the cooperation of stakeholders that live within the watershed or have management responsibilities for the lands and the surface and ground water resources within. Arizona's Nonpoint Source Program relies on this type of cooperation, education and partnership as the primary method to reduce nonpoint source pollution and improve the state's water quality.

Arizona's Nonpoint Source Program focuses on the following land use activities that have been shown to negatively impact surface and ground water within the state:

- Agriculture
- Forestry
- Urban runoff
- Hydromodification
- Onsite/septic waste treatment systems
- Mining
- Recreation

The Nonpoint Source Program aims to address water quality issues, educate the public to build a better understanding of the remaining water quality challenges and solutions, promote a public stewardship ethic and commitment, and encourage public involvement and support for watershed protection programs. Arizona's Nonpoint Source Program integrates the state's Clean Water Act and

Safe Drinking Water Act programs with voluntary incentives. ADEQ uses a combination of tools including: surface and ground water monitoring, watershed inventories, watershed characterizations, Total Maximum Daily Load (TMDL) studies, TMDL implementation plans, public drinking water system source water assessment plans, watershed-based plans, and water quality improvement projects to protect the state's water resources from nonpoint source pollution.

ADEQ's staff works closely with stakeholders to develop community-led, watershed-based planning efforts. These local planning efforts assist the Department in developing programs and outreach activities appropriate to the specific area and the issues. Since Arizona has a large amount of publicly owned lands, partnerships with federal, state and tribal land and resource management agencies are a key element in the program's success.

The other programs described in this chapter, along with the ambient Ground Water Monitoring Program described in Chapter VII, comprise the core of the Nonpoint Source Program administered in Arizona.



Fences direct horses across Nutrioso Creek via a bridge to help reduce erosion of the streambanks and decrease sediment loads in the stream. The bridge and fences were constructed by a local rancher using water quality improvement grant funds awarded by ADEQ. The rancher has constructed off-channel drinkers as an alternate source of water for livestock.

Surface Water Monitoring

ADEQ's field personnel obtain water quality data that are used to assess the biological, chemical, and physical integrity of Arizona's rivers, streams, lakes, and reservoirs.

The primary objectives of this program are to provide credible data to support the following:

- Ongoing monitoring of the waters of the state as required by state law;
- Determination of water quality trends at long-term sites;
- Characterization of baseline water quality of surface waters located in selected watersheds according to the 5-year watershed monitoring schedule;
- Support for surface water quality assessments, identification of impaired surface waters, and the specific causes of impairment;
- Determination of compliance with applicable surface water quality standards;
- Determination of baseline water quality in the state's Unique Waters and whether water quality is being adequately protected or is being degraded; and
- Development of new water quality standards, especially for physical and biological integrity. For example, trend determination at regional biocriteria and habitat reference sites in support of bioassessments and to test indexes of biological integrity.

Fixed Station Network Monitoring – The core of the ambient water quality monitoring program is ADEQ's Fixed Station Network (FSN). This monitoring program's primary purpose is to characterize baseline water quality of perennial, wadeable streams and to provide data to determine long-term water quality trends. This program incorporates longer monitoring time frames (more than 20 years) and lower site densities than the Watershed Characterization Monitoring Program. ADEQ fixed sampling sites are sampled quarterly each year. Long-term fixed station sites have been established on wadeable, perennial streams in nine of the ten major watersheds in the state. USGS provides the fixed station sites in the 10th watershed -- the Colorado - Grand Canyon Watershed (see USGS below). Currently there are 28 ADEQ fixed station sites (**Figure 43**).

Analytical Suite

Analytes being tested will vary based on the monitoring purpose. The following suite of analytes are collected at ambient monitoring sites:

Field data: Dissolved oxygen, pH, specific conductance, stream flow, turbidity, air temperature, water temperature, site characteristics, photographs. For lakes add redox, secchi depth, depth (not flow), and chlorophyll a.

General chemistry: Specific conductance, pH, calcium, magnesium, sodium potassium, chloride, sulfate, fluoride, turbidity, total dissolved solids, total suspended solids, hardness, carbonate, bicarbonate, alkalinity (total and phenolphthalein). For lakes add chlorophyll a and algae identification.

Nutrients: Ammonia (as nitrogen), phosphorus (total as phosphorus), nitrate/nitrite (total as nitrogen), total Kjeldahl nitrogen.

Metals: Antimony, arsenic, barium, beryllium, boron (total), cadmium, chromium, copper, lead, mercury, manganese (total), selenium, zinc.

Bacteria: *Escherichia coli*.

In addition, suspended sediment concentration will be collected at all future ambient stream sites.

USGS Cooperative Fixed Station Network Monitoring -- For a number of years, ADEQ has participated in a joint funding agreement with the U.S. Geological Survey to operate the Cooperative Fixed Station Network monitoring program (USGS Co-op Program). The USGS conducts water quality monitoring at 19 USGS Co-op Program sites located on Arizona's larger rivers, which are of a size and annual flow that precludes ADEQ staff from the ability to monitor (Figure 43). USGS also maintains gage stations at these sites. Water quality data are collected quarterly at sites located on the Colorado River, Salt River, Gila River, Bill Williams River, and the Verde River.

Watershed Characterization Monitoring -- ADEQ has identified 10 major surface watersheds in Arizona. In 1998, ADEQ adopted a rotational watershed framework in which staff conducts water quality monitoring in wadeable, perennial streams located in two watersheds each year. All 10 watersheds are monitored over a 5-year cycle. The watershed schedule is shown in Table 42.

Table 43. Arizona's watershed cycle

WATERSHEDS	FOCUS YEARS 1999 - 2011												
	99	00	01	02	03	04	05	06	07	08	09	10	11
Bill Williams					X					X			
Colorado - Lower Gila					X						X		
Colorado - Grand Canyon						X*					X		
Little Colorado - San Juan			X					X					X
Middle Gila				X					X				
Salt				X					X				
San Pedro - Willcox Playa - Rio Yaqui		X					X					X	
Santa Cruz - Rio Magdalena - Rio Sonoyta			X					X					X
Upper Gila		X					X					X	
Verde	X					X				X			

Note: Staff conduct watershed monitoring on the state fiscal year calendar, which starts July 1st and ends June 30th of the following calendar year. For example, 2004 starts on July 1, 2003 and ends June 30, 2004.

*Monitoring in the Colorado-Grand Canyon Watershed was deferred in 2004 due to budget constraints.

The purpose of this monitoring is to obtain basic water quality data on streams and lakes in each watershed. Along with the analytical samples collected (see analytical suite text box), annual bioassessments and habitat assessments are made each spring to assess the health of the aquatic communities in wadeable, perennial streams.

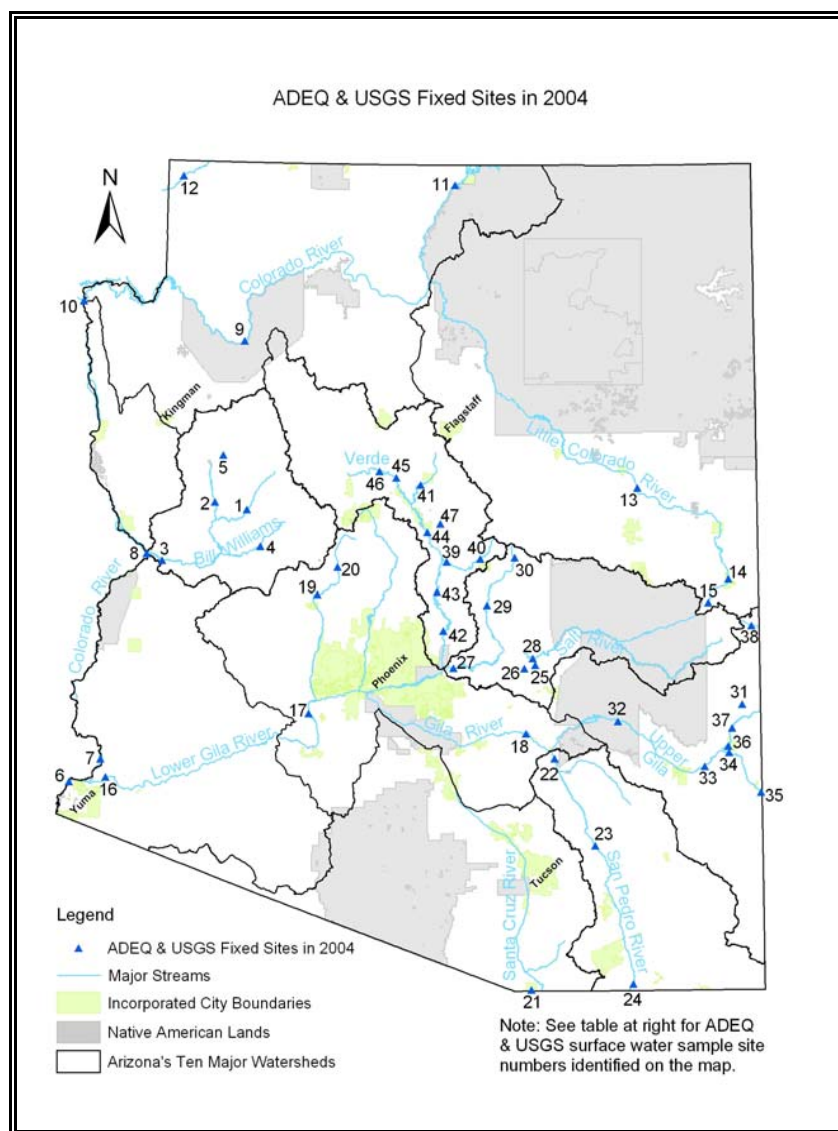


Figure 43. Fixed long-term monitoring sites

MAP #	STREAM NAME	SITE DESCRIPTION	AGENCY
1	Burro Creek	at Six Mile Crossing	ADEQ
2	Big Sandy River	above Highway 93 bridge	ADEQ
3	Bill Williams River	near Mineral Wash	ADEQ/USGS
4	Santa Maria River	below Highway 93 bridge	ADEQ
5	Trout Creek	near Wikieup	ADEQ
6	Colorado River	at Mexico above Morelos Dam	ADEQ/USGS
7	Colorado River	above Imperial Dam	ADEQ/USGS
8	Colorado River	below Parker Dam	ADEQ/USGS
9	Colorado River	above Diamond Creek	USGS
10	Colorado River	below Hoover Dam	USGS
11	Colorado River	at Lee's Ferry	ADEQ/USGS
12	Virgin River	at Littlefield	USGS
13	Little Colorado River	at Woodruff	ADEQ
14	Little Colorado River	below Springerville	ADEQ
15	West Fork Little Colorado River	at Govt Springs near Greer	ADEQ
16	Gila River	near Dome	ADEQ
17	Gila River	above Gillespie Dam diversions	ADEQ/USGS
18	Gila River	at Kelvin	ADEQ/USGS
19	Hassayampa River	at Box Canyon near Wickenburg	ADEQ
20	Hassayampa River	below Milk creek near Wagoner	ADEQ
21	Nogales Wash	at Morley Ave. Tunnel	ADEQ
22	San Pedro River	near Dudleyville	ADEQ
23	San Pedro River	at Cascabel	ADEQ
24	San Pedro River	at Palominas	ADEQ
25	Pinal creek	at Inspiration Dam	ADEQ
26	Pinto Creek	above Henderson Ranch Ford	ADEQ
27	Salt River	below Stewart Mountain Dam	ADEQ/USGS
28	Salt River	near Roosevelt Lake	ADEQ/USGS
29	Tonto Creek	above Gun Creek	ADEQ
30	Tonto Creek	below Christopher Creek	ADEQ
31	Blue River	at Juan Miller Road crossing	ADEQ
32	Gila River	near Calva	ADEQ/USGS
33	Gila River	at head of Safford Valley	ADEQ/USGS
34	Gila River	at Old Safford Bridge	ADEQ
35	Gila River	near Duncan	ADEQ
36	San Francisco River	below Clifton	ADEQ
37	San Francisco River	above Clifton	ADEQ
38	San Francisco River	above Luna Lake near Alpine	ADEQ
39	East Verde River	near Childs	ADEQ/USGS
40	East Verde River	at Perkinsville Bridge	ADEQ
41	Oak Creek	at Red Rock Crossing	ADEQ
42	Verde River	below Bartlett Dam	ADEQ/USGS
43	Verde River	below Tangle Creek	ADEQ/USGS
44	Verde River	at Beasley Flat	ADEQ
45	Verde River	near Clarkdale	ADEQ/USGS
46	Verde River	at Perkinsville Bridge	ADEQ
47	West Clear Creek	near Camp Verde	USGS

Unique Waters – As resources allow, surface water quality data are collected on Arizona’s outstanding state resource waters or “Unique waters” during the Watershed Characterization Monitoring. Currently, there are 18 Unique Waters in Arizona. The goal of this program is to acquire enough water quality data to determine water quality trends in these Unique Waters, and therefore, determine whether state antidegradation requirements are being met (i.e., is water quality improving, being maintained, or degrading).

Biocriteria Program -- Bioassessment data are collected to support the development of Arizona’s biocriteria program. ADEQ began research to develop a state biocriteria program in 1992, focusing on using macroinvertebrate communities to assess the biological health of the aquatic system. A warmwater and a coldwater Index of Biological Integrity has been developed for Arizona through this research. Currently, the Biocriteria Program monitoring effort is to test existing indices of biological integrity for warmwater and coldwater streams over a range of impaired conditions and sources of stressors.

Bioassessments and habitat assessments are conducted at biocriteria reference sites, ADEQ FSN sites, watershed sites, and unique water sites to develop Arizona’s regional reference site network statewide and to monitor trends in reference conditions over time. The goal is to conduct bioassessments at a minimum of 10 biocriteria reference sites in each watershed each water year. Benthic macroinvertebrate samples in wadeable, perennial streams with suitable riffle habitats are collected during the spring index period (April, May, or June).



An ADEQ staff member conducts macroinvertebrate sampling with a kick net on the Little Colorado River near Springerville, Arizona.

Lakes Program – Data and information on lake and reservoir water quality are collected by a team of field staff to identify water quality problems and determine potential sources of pollution. The overall objectives of the Lakes Program are to evaluate the water quality status of lakes and reservoirs by identifying natural and human-induced conditions affecting lake water quality and to develop feasible ways to maintain, protect, and restore lake water quality. Biological (algae and chlorophyll), chemical, and physical limnology data are collected to characterize baseline water quality conditions.

The Lakes Program also follows the 5-year watershed monitoring schedule to organize its monitoring activities. Monitoring resources are focused on lakes and reservoirs located within the two major watersheds that are identified for study each water year. The Lakes Program monitoring activities incorporate four basic approaches:

- Baseline water quality monitoring and assessment;
- Targeted monitoring to fill assessment gaps identified on the Planning List;
- TMDL analyses to diagnose and recommend the most feasible ways to improve lake water quality; and
- A criteria development project to classify lakes, that will lead to class-specific water quality standards to protect the lake resources.

Targeted Monitoring From the Planning List - The Planning List that is generated during the assessment process identifies monitoring data gaps. Those waters with an overall ranking of high would be scheduled for monitoring in the two years following assessment report. Medium or low priority waters would be addressed in the subsequent three years, with the objective of having sufficient monitoring data on all waters on the Planning List within the current five-year watershed cycle. However, the current drought in Arizona may delay obtaining sufficient data during critical conditions on some waters on the Planning List.

Targeted monitoring focuses efforts on those surface waters that show the most potential for impairment. These intensive monitoring efforts are designed to ensure monitoring captures seasonality, spatial and temporal variations, and suspected critical loading conditions.

The factors used to prioritize TMDLs are similarly used for the Planning List, except that no designated uses have been assessed as “impaired.” Planning List prioritization considers:

- The number of exceedances compared to the number of samples taken,

and the potential for completing the sample collection necessary to make an assessment;

- Whether there are critical conditions (season, precipitation, activity in the watershed) when exceedances occur, so that sample collection is scheduled when these conditions are represented;
- Watershed monitoring rotation, when listed due to insufficient data rather than exceedances;
- Development of comprehensive watershed management plans; and
- Whether the surface water has been on the 303(d) List in the past.

Total Maximum Daily Load (TMDL) Program

ADEQ's TMDL Program must develop Total Maximum Daily Loads for each surface water identified as impaired. TMDLs must be initiated for surface waters identified as "high priority" within the first two years following list approval by EPA. All other waters ranking medium or low priority are scheduled for TMDL development within the next two 5-year watershed cycle. However, the fact that Arizona is in the fifth year of a drought poses a significant obstacle to the completion of scheduled TMDLs. Some impaired waters may flow only during precipitation events and have water quality problems which only appear during heavy storms.

A Total Maximum Daily Load Analysis (TMDL)

A TMDL is a written, quantitative plan and analysis to determine, on a pollutant specific basis, the maximum loading a surface water can assimilate and still attain and maintain a specific water quality standard during all conditions. The TMDL allocates the loading capacity of the surface water to point sources and nonpoint sources identified in the watershed, accounting for natural background and seasonal variation, with an allocation set aside as a margin of safety.

TMDL development leads to identification of a surface water load and waste load capacity for each pollutant. The final TMDL includes point source (waste load) allocations, nonpoint source (load) allocations, and load reductions necessary for attainment of water quality standards based on the critical conditions for loading. Records review, stakeholder interviews, field reconnaissance, field measurements, and modeling are performed to better understand the location, magnitude, and conditions causing the impairment. This process ultimately leads to an understanding of what needs to be done to reduce and prevent the impairment, and how long it might take the surface water to attain water quality standards.

The TMDL analysis starts with identification of the pollutants of concern and the water quality standards that must be attained to protect designated uses. Pollutant-specific numeric targets are set based on the most stringent water quality standard applicable to the surface water.

Source analysis then identifies the location and magnitude of point source and nonpoint source loadings. Point source waste loads are from discrete conveyances of discharge directly to a surface water (i.e. wastewater treatment plant outfall). Nonpoint source loads are from non-discrete discharges, including runoff generated by activities such as grazing, agriculture, mining and forestry. The TMDL also establishes the naturally occurring "background conditions" of the watershed, which are included in the nonpoint source load category.

A pollutant specific load capacity, which includes a margin of safety, is calculated based on flow characteristics and the numeric target (generally the applicable surface water quality standard). When the load capacity and sum of the sources' contributions during the critical condition are compared, load allocations and necessary load reductions can be determined.

Waste load reductions from point sources can be managed through permitting programs such as Arizona's Pollutant Discharge Elimination System (AZPDES). However, there are no regulatory programs for nonpoint pollution, so load reductions from these sources are strictly voluntary. In Arizona, most surface water impairment is a result of nonpoint source pollution. Nonpoint source pollution may include excessive sediment caused by the denudation of grasslands, the location of roads, construction, bacteria from wildlife and/or recreation, metals from historic mining practices and road cuts through ore bodies, and pesticides from historic agricultural practices.

Stakeholders are encouraged to participate throughout the TMDL process. For most impaired surface waters, achievement of water quality standards will occur through voluntary efforts such as participation in watershed management groups, volunteer monitoring, pursuit of funding for cleanup measures, and education.

The status of surface waters on Arizona's 2002 303(d) List is illustrated in **Figure 44** on the next pages.

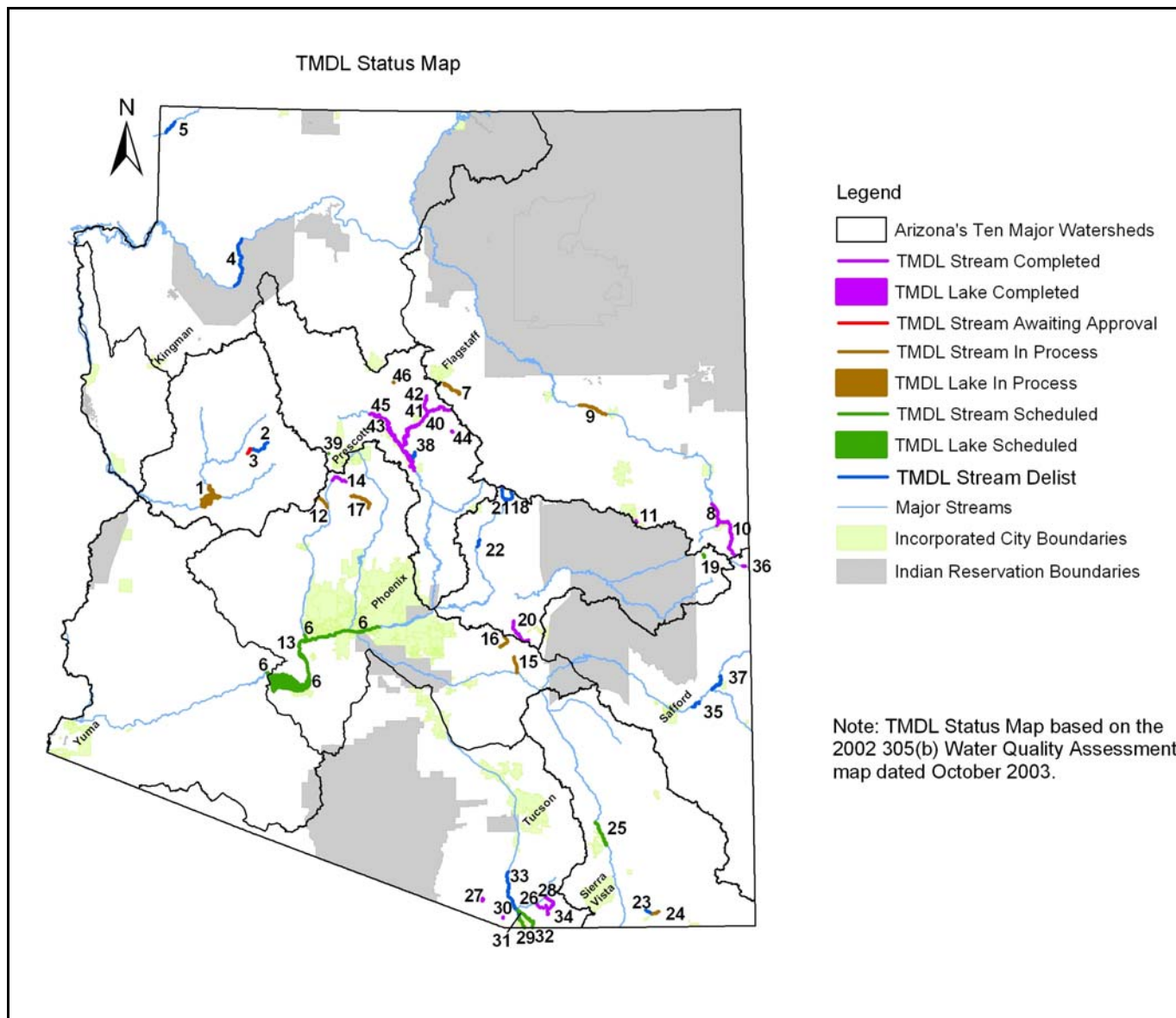


Figure 44. Status of TMDLs in Arizona (see following table for waterbody names)

Status of TMDL Development from 1998 - 2003 (for Figure 44)

Map #	Surface Water Name Segment Description Waterbody ID	Pollutants of Concern Causing Impairment	TMDL Status
Bill Williams Watershed			
1	Alamo Lake AZL15030204-0040	Mercury in fish tissue, high pH, sulfide, dissolved oxygen	In process. Delisting sulfide (change in standard). Delisting dissolved oxygen (attaining standards)
2	Boulder Creek, headwaters - Wilder Creek AZ15030202-006B	Fluoride	Delisting fluoride (change in standard)
3	Boulder Creek, Wilder Creek - Copper Creek AZ15030202-005A	Arsenic, copper, zinc	Awaiting EPA approval of TMDL
Colorado - Grand Canyon Watershed			
4	Colorado River, Parashant - Diamond Creek AZ15010002-003	Turbidity	Delisting turbidity (change in standard)
5	Virgin River, Beaver Dam Wash - Big Bend Wash AZ15010010-003	Turbidity, fecal coliform	Delisting turbidity and fecal coliform (changes in standards)
Colorado - Lower Gila Watershed			
6	Painted Rocks Borrow Pit Lake AZL15070201-1010	DDT metabolites, toxaphene, chlordane, low dissolved oxygen, fecal coliform	Scheduled. Delisting fecal coliform (change in standards)
Little Colorado - San Juan Watershed			
7	Lake Mary (upper) AZL15020015-0900 Lake Mary (lower) AZL15020015-0890	Mercury in fish tissue	In process
8	Little Colorado River, Water Canyon - Carnero Wash AZ15020001-009, -010	Turbidity	Complete
9	Little Colorado River, Porter Tank - McDonalds Wash AZ15020008-017	Copper, silver	In process
10	Nutrios Creek, headwaters - Little Colorado River AZ15020001-017, -015	Turbidity	Complete
11	Rainbow Lake AZL15020005-1170	Nitrogen, phosphorus, pH	Complete
Middle Gila Watershed			
12	French Gulch, headwaters - Hassayampa River AZ15070103-239	Copper, manganese, zinc	In process. Delisting manganese (change in standards)
6	Gila River, Salt River to Painted Rock Res. AZ15070101-015, -014, -010, -009, -008, -007, -005, -001 Salt River, 23 rd Ave WWTP - Gila River AZ15060106B-001D Hassayampa River Below Buckeye Canal AZ15070103-001B Painted Rock Reservoir AZL15070101-1020	DDT metabolites, toxaphene, chlordane	Scheduled
13	Gila River, Centennial Wash - Gillespie Dam AZ15070101-008	Boron (Also included in list above for pesticides)	Scheduled
14	Hassayampa River, headwaters - Copper Creek AZ15070103-007	Cadmium, copper, zinc	Complete
15	Mineral Creek, Devils Canyon - Gila River AZ15050100-012B	Copper	In process
16	Queen Creek, headwaters - Superior Mine WWTP AZ15050100-014A	Copper	In process
17	Turkey Creek, headwaters - Poland Creek AZ15070102-036B	Cadmium, copper, zinc	In process

Map #	Surface Water Name Segment Description Waterbody ID	Pollutants of Concern Causing Impairment	TMDL Status
Salt Watershed			
18	Christopher Creek, headwaters - Tonto Creek AZ15060105-353	Turbidity	Delisting turbidity (change in standards)
19	Crescent Lake AZL15060101-0420	pH	Scheduled
20	Pinto Creek, headwaters - Ripper Springs AZ15060103-018	Copper	Completed. Phase II TMDL in process (shown as complete)
21	Tonto Creek, headwaters - Haigler Creek AZ15060105-013	Turbidity	Delisting turbidity (change in standards)
22	Tonto Creek, Rye Creek - Gun Creek AZ15060101-008	Turbidity	Delisting turbidity (change in standards)
San Pedro - Willcox Playa - Rio Yaqui Watershed			
23, 24	Mule Gulch, headwaters - Whitewater Draw AZ15080301-090A, -090B	Copper, zinc, low pH.	In process. (Reach has subsequently been resegmented.)
25	San Pedro River, Dragoon Wash - Tres Alamos Wash AZ15050202-002	Nitrate	Scheduled
Santa Cruz - Rio Magdalena - Rio Sonoyta Watershed			
26	Alum Gulch, headwaters - ephemeral reach AZ15050301-581A, -581B	Cadmium, copper, zinc, pH.	Complete
27	Arivaca Lake AZ15050304-0080	Mercury	Complete
28	Harshaw Creek, headwaters - ephemeral reach AZ15050301-025	Copper, zinc, low pH	Complete
29	Nogales and East Nogales Washes, Mexico border - Potrero Creek AZ15050301-011	Chlorine, turbidity, fecal coliform	Scheduled. Delisting fecal coliform (change in standard)
30	Pena Blanca Lake AZL15050301-1070	Mercury	Complete
31	Potrero Creek, Interstate 19 - Santa Cruz River AZ15050301-500B	Fecal coliform	Delisting fecal coliform (change in standard)
32	Santa Cruz River, Mexico border - Nogales International WWTP discharge AZ15050301-010	Escherichia coli, fecal coliform	Scheduled. Delisting fecal coliform (change in standard)
33	Santa Cruz River, Nogales International WWTP discharge - Josephine Canyon AZ15050301-009	Fecal coliform	Delisting fecal coliform (change in standard)
33	Santa Cruz River, Josephine Canyon - Tubac Bridge AZ15050301-008A	Fecal coliform, turbidity.	Delisting fecal coliform and turbidity (changes in standards)
33	Santa Cruz River, Tubac Bridge - Sopor Wash AZ15050301-008B	Fecal coliform	Delisting fecal coliform (change in standard)
34	Three R Canyon, headwaters - ephemeral segment AZ15050301-558A, -558B, -558C	Cadmium, copper, zinc, pH.	Complete

Map #	Surface Water Name Segment Description Waterbody ID	Pollutants of Concern Causing Impairment	TMDL Status
Upper Gila Watershed			
35	Gila River, Bonita Creek - Yuma Wash AZ15040005-022	Turbidity	Delisting turbidity (change in standard)
36	Luna Lake AZL15040004-0840	Dissolved oxygen, nitrogen, phosphorus, pH	Complete
37	San Francisco River, Limestone Gulch - Gila River AZ15040004-001	Turbidity	Delisting turbidity (change in standard)
Verde Watershed			
38	Beaver Creek, Dry Beaver-Verde River AZ15060202-002	Turbidity	Delisting turbidity (change in standard)
39	Granite Basin Lake AZL15060202-0580	Dissolved oxygen	Delisting (Investigation showed low dissolved oxygen was due to natural conditions during lake turnover).
40	Munds Creek, headwaters -Oak Creek AZ15060202-415	Nitrogen, phosphorus	Complete
40	Oak Creek, headwaters - Verde River AZ15060202-019, -018A, -018C, -017, -018	Nitrogen, phosphorus	Complete
41	Oak Creek, at Slide Rock State Park AZ15060202-018B	<i>Escherichia coli</i> , fecal coliform	Complete
42	Oak Creek, West Fork Oak Creek-Dry Creek AZ15060202-018A, B, and C	Turbidity	Delisting turbidity (change in standard and designated use)
43	Pecks Lake AZL15060202-1060	Dissolved oxygen, pH	Complete
44	Stoneman Lake AZL15060202-1490	Dissolved oxygen, pH	Complete
45	Verde River, unnamed tributary (15060202-065) - West Clear Creek AZ15060202-037, -025, -015, -001, and AZ15060203-027	Turbidity	Complete
46	Whitehorse Lake AZL15060202-1630	Dissolved oxygen	In process

Note that the map and table:

- Report on TMDLs completed after 1998
- Do not reflect 2004 303(d) Listing being sent to EPA, except where noting delisting,
- Show status on the map as “delist” only if all parameters are to be removed from the 303(d) List, while table may indicate that a parameter is being removed while others are remaining.
- Show status on the map as “complete,” although the table indicates a Phase II TMDL has been initiated.

Watershed Management

ADEQ focuses on six watershed management activities, which will be discussed in this section:

- Development of water quality watershed-based management plans and watershed characterization studies, currently through the Nonpoint Source Education for Municipal Officials (NEMO) Project;
- Development of TMDL implementation plans;
- Coordination with local watershed groups across Arizona who are actively developing and implementing watershed-based plans and TMDL implementation plans;
- Volunteer monitoring
- Grants and outreach for available Water Quality Improvement Grants; and
- Regional 208 water quality planning.

Further information about these programs can be obtained at ADEQ's web site: <http://www.adeq.state.az.us>.

Watershed-based Management Plans and the NEMO Project -- Based on EPA guidance (*Supplemental Guidelines for the Award of Section 319 Nonpoint Source Grants to States and Territories in FY 2003*), watershed-based plans must include nine key elements. Where the watershed-based plan is designed to implement a TMDL, these elements help provide reasonable assurance that the nonpoint source load allocations identified in the TMDL will be achieved. However, even if a TMDL has not yet been completed, EPA believes that these nine elements are critical to assure that public funds to address impaired waters are used effectively.

In broad terms, the elements that EPA requires for a watershed based plan are:

- | | |
|------------|------------------------------------|
| Element 1: | Causes and sources |
| Element 2: | Expected load reductions |
| Element 3: | Management measures |
| Element 4: | Technical and financial assistance |
| Element 5: | Information/education component |
| Element 6: | Schedule |
| Element 7: | Measurable milestones |
| Element 8: | Evaluation of progress |
| Element 9: | Effectiveness monitoring |

EPA funded a Nonpoint Source Education for Municipal Officials (NEMO) Project through the University of Arizona's Cooperative Extension Service. After experimenting with different ideas, University of Arizona and ADEQ agreed that this project would benefit Arizona most if the comprehensive characterization documents evolved into a watershed-based plans for the three target watersheds:

- Bill Williams Watershed,
- Verde Watershed, and
- Upper Gila Watershed.

The goals of this project are:

- Characterize the watershed (soils, slope, population, geology, etc.).
- Identify areas that are susceptible to water quality problems and pollution (point and nonpoint sources). The plans will not only identify 303(d) listed or non-attaining waters, but also identify those waters/areas that are vulnerable to degradation.
- Identify the sources that need to be controlled to protect or improve water quality.
- Identify the problem areas ADEQ and/or stakeholders should address through monitoring or project implementation. Identify pristine areas (i.e. unique waters or special areas of concern) that need to be protected.
- Identify management measures to be implemented to protect or improve/restore water quality. Where and why? Estimate costs of the potential management measures.
- Estimate the load reductions expected from the different management measures. Rank the management measures to demonstrate which measures are the most effective means for protecting or restoring water quality.

These watershed-based plans will include many of the same elements of a TMDL implementation plan but are written for a much larger area. The University of Arizona will also include implementation recommendations that will assist ADEQ in focusing on potential problems and problem areas. Once the plans are complete, the University of Arizona Cooperative Extension Service will educate local land-use decision makers and other stakeholders.

This project will greatly increase the agency's knowledge of the watershed and help to more effectively fund water quality grant projects in Arizona. By characterizing and understanding the dynamics of each watershed, these watershed-based plans will also help ADEQ with their TMDL and monitoring

efforts. Watershed characterizations will help the monitoring programs improve site selection and identify priority-planning sites.

TMDL Public Involvement and TMDL Implementation Plans -- ADEQ tries to proactively involve and educate the stakeholders affected by the TMDL process. The goal is to involve these stakeholders while the TMDL is being written, so that citizens are aware of the problems up-front and can realize their role in helping remedy the identified problems through development of a TMDL implementation plan.

After the load and wasteload allocations are established in the TMDL, corrective actions or changes in practices must be implemented in the watershed so that these allocations will be met in the future. TMDL Implementation Plans (TIPs) provide a strategy that explains how the allocations in the TMDL and any reductions in existing pollutant loadings will be achieved and the time frame in which compliance with applicable surface water quality standards is expected to be achieved. These plans may include a phased process with interim targets for load reductions.

Based on EPA guidance, each implementation plan includes the following components:

- A description of the Best Management Practices, or other management measures, and associated costs that must be implemented to achieve the load reductions estimated in the plan (recognizing the natural variability and the difficulty in predicting the performance of the practices over time). An identification (using a map or a description) of the critical areas where those measures are needed.
- An action plan for implementing the management measures identified in the plan. This would include a schedule of interim, measurable milestones for determining whether the management measures or other control actions are being implemented effectively.
- A description of methods that will be used to evaluate the progress and effectiveness in achieving the plan goals.
- An information/education component that will be used to enhance public understanding of the project and encourage their early and continued participation in selecting, designing, and implementing BMPs.

- An estimate of the amounts of technical and financial assistance needed, associated costs, and/or the sources and authorities that will be relied upon, to implement the plan.

TMDL Implementation Plans use the information contained in the TMDL to develop a plan that encompasses the entire area causing known or potential pollution and contributing to the impairment. Scale varies depending on the causes and sources of contamination. Through active public involvement during the TMDL development, by the time the TMDL is completed, a TMDL Implementation Plan should also be written.

Development of these plans are to be community-led, when possible, and focus on encouraging volunteer groups to lead the way in implementing water quality improvement projects through the use of ADEQ's Water Quality Improvement Grant Program or other funding sources. The goal is to make sure that all of Arizona's waterbodies are clean and safe for uses such as swimming or fishing.



TMDLs for arsenic, copper and zinc are near completion on this reach of Boulder Creek, near Bagdad, Arizona. The Hillside Mine tailings piles in the background are major contributing sources of metals in the stream. Implementation plans are in the planning stages.

How Can I Get Involved?

Watershed Groups -- The importance of working with interested participants at the watershed level cannot be overstated. It is important that all affected parties clearly understand the issues impacting water quality. Successful strategies to improve water quality need to be tailored to the social and hydrological reality within each watershed or drainage area.

Watersheds are geographic areas with natural boundaries that do not correspond with political boundaries. City, county, state, and federal jurisdictions can be a maze of legal and political perspectives, as well as different and diverse management goals to work through. For any comprehensive watershed approach to have long term success, it must involve private and public landowners, numerous political jurisdictions and coalitions of special interest groups. Through federal, state, and local partnerships, the goal of providing a cleaner, safer environment and ensuring its integrity for future generations can be achieved.

Successful watershed management strategies must rely on the cooperation of all stakeholders that live within the watershed or have management responsibilities for the lands and the waterbodies within. ADEQ relies on this type of cooperation, education, and partnership as the primary method to reduce nonpoint source pollution and improve the state's water quality. A list of active watershed partnerships in Arizona is provided in **Table 43** on the next page. These groups vary in their purpose and scope of concern, as some groups were established primarily for oversight for a specific TMDL, while others have more long-standing concerns about water quality and water quantity in their watershed.

By involving local communities, tribes, and private-sector organizations, Arizona is focusing and prioritizing restoration activities to achieve significant improvements in water resources, aquatic ecosystems and watershed health. More information can be found at:
<http://www.azdeq.gov/comm/download/water>.

Volunteer Monitoring -- Across the nation, volunteer groups monitor the condition of streams, rivers, lakes, reservoirs, estuaries, coastal waters, wetlands, and wells. They do this because they want to help protect a stream, lake, or wetland near where they live, work, or play. Their efforts are of particular value in providing quality data and building stewardship of local waters.

Volunteers can make visual observations of habitat, land uses, and the impacts of storms, measure the physical and chemical characteristics of waters and assess

the abundance and diversity of living creatures, including aquatic insects, plants, fish, birds, and other wildlife. Volunteers can also clean up garbage-strewn waters and become involved in restoring degraded habitats. The number, variety, and complexity of these projects continues to increase.

During the next year, ADEQ will be devoting efforts to develop a Volunteer Monitoring Program. Volunteer groups across Arizona will be able to collect data to supplement the water quality information collected by ADEQ. The volunteer data can be used by ADEQ to: screen water for potential problems, further research or restoration efforts, establish baseline conditions or trends for waters that would otherwise go unmonitored, and help evaluate the success of Best Management Practices implemented to mitigate problems. Helping volunteer groups to collect credible and scientifically defensible water quality data is important since ADEQ, like many other organizations, must continue to do more with less resources in both personnel and funding.

Since 2003, ADEQ has been working closely with GateWay Community College in Phoenix, Arizona, to develop a modular water quality curriculum to train volunteers and others in proper sampling techniques, development of Sample and Analysis Plans and Quality Assurance Plans, and care and maintenance of equipment. The goal is to have a curriculum that can be tailored to the specific needs of the group while providing ADEQ with valuable water quality information.

ADEQ looks forward to working with volunteer monitoring groups. This coordination will also ensure, to the extent practical, that the groups collect data that meet Arizona's credible data requirements in the Impaired Water Identification Rule (Arizona Administrative Code R18-11-6) and can therefore be used to assess the status of water quality in Arizona's surface waters.

Table 44. Arizona watershed partnerships

Name of Partnership	Watershed Area	Primary Objectives	When and Where Meeting	Contact
Bill Williams Watershed				
Upper Bill Williams	The Upper Bill Williams watershed area is approximately defined by the Kirkland Creek watershed, a 405 square mile drainage, which is tributary to the Santa Maria River.	<p>Mission is to manage and protect the water resource, water quality, and water rights. Advocates local control over our water resources and land use. Objectives are:</p> <ul style="list-style-type: none"> - Ensure that surface and ground water resources are maintained at the current balance, to support irrigation, ranching, and domestic uses, as well as maintain excellent waterfowl and wildlife habitat. - Disseminate information so that citizens are well-informed of events and legislative activity that may impact them. - Cooperate with other rural watershed groups to influence favorable water legislation for rural areas. 	3 rd Thursday of the month Skull Valley Community Center	Sondra Wilkening, secretary, (928) 925-6434 westwindsinc@yahoo.com Troy Suter (928) 442-3885
Colorado - Grand Canyon Watershed and Colorado - Lower Gila Watershed				
Northwest Arizona Watershed Council	The area is defined by three groundwater basins: Hualapai Valley Basin and Sacramento Valley Basin in the Colorado - Grand Canyon, and the Big Sandy Basin in the Colorado - Lower Gila Watershed	Goal is to protect and preserve water and educate the public. The council recognizes the need for more information to adequately model supply and demand equations and relate these to general plans for development. Identifies and cleans up illegal dumping and other nonpoint source pollution.	Mohave County Public Library, 3269 N. Burbank, Kingman, Az. 4 pm 3 rd Wednesday of the month	Elna Roundy (928) 757-2818 Earl Engelhardt (928) 692-1068 imsprite@kingmanaz.net
Little Colorado - San Juan Watershed				
Little Colorado River Multi Objective Management Group (LCR MOM)	This immense watershed covers nearly 27,000 square miles in northeast Arizona and northwest New Mexico.	<p>The LCR MOM vision is to maintain and enhance the quality of life in this watershed through science and tradition based management of natural resources, in a way that ensures equity among shared interests, respects diverse cultural values, preserves environmental health of our land, while promoting appropriate economic growth and financial security of present and future generations.</p> <p>The focus issues include:</p> <ul style="list-style-type: none"> - Cultural resource preservation; - Economic development and recreation; - Education outreach; - Erosion and sediment control; - Flood loss reduction; - Water quality and quantity improvement; and - Watershed management enhancement. 	Every other 3 rd Wednesday, for 2 days Holbrook or Winslow	Jim Boles (928) 289-2422 Dennis Chandler (928) 524-6063, Ext.5 dennis.chandler@az.usda.gov
Show Low Creek	Show Low Creek drainage from Pinetop Springs and Thompson Springs to Fools Hollow Lake.	This grass roots group works to effect changes that will benefit the water quality and quantity. They are a member of the LCR MOM.	Meet on an as needed basis.	Tom Thomas (928) 368-8885 tthomas@ci.pinetop-lakeside.az.us
Silver Creek Advisory Commission	The Silver Creek drainage area	They are a member of the LCR MOM.	2 nd Monday of the month Holbrook	Ron Solamon (928) 536-7366 Kerry Ballard (928) 536-2539 kballard@usa.net

Name of Partnership	Watershed Area	Primary Objectives	When and Where Meeting	Contact
Upper Little Colorado River Watershed Partnership	The Little Colorado River drainage above Lyman Lake	They are a member of the LCR MOM.	3 rd Thursday of the month. Springerville	Bill Greenwood (928) 333-4128 (x-226) bgreenwood@eagar.com
Middle Gila Watershed				
Tres Rios River Management Group Federally sponsored by the US Army Corp of Engineers and locally sponsored by the City of Phoenix.	Watershed is the Salt River and Gila River drainage delineated by approximately Southern Ave (north) Baseline Ave (south), 83 rd Ave (east), and Agua Fria River (west).	The issues identified by this group include: - Stressors identified (inorganic and organic chemicals, pesticides, PBCs, and low dissolved oxygen); - Flood flows; - Agricultural storm water runoff; - Agricultural irrigation drainage and dewatering; - Concentrated animal feeding operation discharges; - Wastewater treatment plant discharges; - Landfill leachate; - Ground water inflow; - Sand and gravel area releases; and - Degradation of wildlife habitat.	Steering committee meets on the third Wednesday of the month.	Alice Brawley-Chesworth (City of Phoenix) (602) 262-1828 alice.brawleychesworth@phoenix.gov
Upper Agua Fria Watershed Partnership	Aqua Fria River drainage area, excluding the Prescott AMA and the Phoenix AMA.	Water quality and water quantity issues identified by this group include: fast growth and development in the Prescott AMA; ranching/grazing issues; leaking underground storage tanks; illegal dumping along streams and in the National Monument; and water legal rights.	2 nd Tuesday of the month, meeting usually at Arcosanti	Mary Hoadley (928) 632-7135 earthhous@aol.com
Salt Watershed				
Friends of Pinto Creek	Pinto Creek is a tributary to the Salt River and Roosevelt Lake.	Dedicated to the preservation of Pinto Creek, Powers Gulch, and Haunted Canyon.	Meet as needed	Tom Sonandres 623 583-6764 pintocreek@asu.edu
Northern Gila County Water Planning Alliance (a.k.a. Mogollon Highlands)	Watershed is bounded by the Mogollon Rim to the north, Roosevelt Lake to the south, Sierra Ancha Mountains to the east, and Mazatzal Mountains to the west.	The Northern Gila County Water Plan Alliance formed to develop water strategies for the area around Payson, Pine and Strawberry along the Mogollon Rim. The area also is known as the Tonto Creek basin.	1 st Thursday of the month Star Valley	Ron Christensen, Chair (928) 474-2029 Lionel Martinez, Rim Trail Water Improvement District (928) 474-2029 Howard Matthews, Pine-Strawberry WID (928) 476-2142 Robert Mawson, Program Coordinator, (928) 473-2233 mawson@cablene.net

Name of Partnership	Watershed Area	Primary Objectives	When and Where Meeting	Contact
San Pedro - Willcox Playa - Rio Yaqui				
Campomocho-Sacaton Watershed Group	Watershed is a 42,000 acre sub-watershed of the Willcox Playa including: Gillman Canyon, Apache Canyon, Reservoir Canyon, Sacaton Wash, an unnamed drainage (referred to as Big Draw) and Campomocho Draw. This area falls almost entirely within the ranch boundaries of Hook Open A Ranch and Redtail Ranch.	The group's primary objective is to implement conservation practices that will improve watershed health, improve water quality, and reduce downstream flood damages. Practices are specifically aimed at reducing soil erosion and water runoff, increasing ground cover, and improving wildlife habitat to reduce negative economic impacts.	Quarterly meetings at Willcox	Donna Matthews (520) 384-2229, ext 122 donna.matthews@az.usda.gov Dan Skinner at ds Skinner@goldtechind.com
Upper San Pedro Partnership	1,875 square mile basin from the Mexico border north to "the Narrows." The Huachuca, Mustang, Whetstone, and Rincon Mountains form the basin's western boundary and the Mule, Dragoon, Little Dragoon, and Winchester Mountains form the eastern boundary.	Purpose of the partnership is to coordinate and cooperate in the identification, prioritization and implementation of comprehensive policies and projects to assist in meeting water needs in the Sierra Vista Sub-watershed of the Upper San Pedro River Basin.	2 nd Wednesday of the month Sierra Vista	George Michael, Coordinating manager (520) 378-4046 gmichael2@mindspring.com Bob Strain, Chairman Advisory Council 520 459-4763
Middle - Lower San Pedro Partnership	San Pedro River drainage area, between the Narrows near Charleston, Arizona, and its confluence with the Gila River at Winkelman, Arizona.	This grass roots group works to effect changes that will benefit the water quantity and quality.	Meetings as needed	Resource Conservation and Development Agency: Sharon Reid (520) 586-3347 spvnrcl@theriver.com
Santa Cruz - Rio Magdalena - Rio Sonoyta Watershed				
Friends of the Santa Cruz River	Watershed includes the entire Santa Cruz River; however, the group generally focuses on the stretch from the international border to the Santa Cruz County - Pima County boundary.	Major issues of concern being addressed by this group include: - Maintaining existing flow, ground water pumping, and population growth demands; - Flood control and land uses; - Impacts on water quality of land uses, off road vehicles, public access, illegal dumping; - Monitoring water quality; - Understanding economics and resource management; - Maintaining wilderness experience, cultural and historic uses, river oasis, habitat improvements, control of exotic species, and protection of endangered species; and - Weaknesses in international planning and cooperation.	3 rd Thursday of the month Tubac	Ben Lomeli, President (520) 281-4904
Pima Association of Governments (PAG) Watershed Planning Subcommittee	Santa Cruz River watershed, focusing on the portion within Pima County.	The subcommittee provides a forum for exchanging information among stakeholders, conducting technical review of proposals and plans, and advising decision makers on matters affecting the Santa Cruz River watershed. The subcommittee coordinates with PAG's Stormwater Management Working Group and reports to PAG's broader Environmental Planning Advisory Committee.	Quarterly meetings - 3 rd Thursday of first month of quarter 177 N. Church, Tucson	website: http://www.pagnet.org/WQ/participation.htm e-mail: wq@pagnet.org

Name of Partnership	Watershed Area	Primary Objectives	When and Where Meeting	Contact
Upper Gila Watershed				
Gila Watershed Partnership	Gila River Watershed is about 6,000 square miles, extending from the New Mexico border to the Coolidge Dam (San Carlos Reservoir).	Objectives: - Conserve natural resources and enhance the environment, while maintaining or improving the economy; - Increase water quality and improve water quantity; - Increase recreational opportunities; and - Collaborate among partners and neighbors in New Mexico and the San Carlos Apache Tribe within the watershed.	2 nd Tuesday of the month in Graham County General Services building in Safford.	Jan Holder (928) 348-4577 watershedholder@yahoo.com
Eagle Creek	Eagle Creek is a sub-watershed within the Upper Gila Watershed.		As needed on Saturdays	Chase Caldwell, (480) 635-1245
Verde Watershed				
North Central Arizona Regional Watershed Consortium (NCARWC)	Verde River Watershed, largely defined by Yavapai County boundaries.	Formed to accomplish cooperative regional water management and reduce argument over water rights. Believes that a unified and knowledgeable voter base in rural Arizona may be able to effect the needed changes in Arizona water laws and statues.	Meeting times and places vary. Contact president (currently Barbara Litrell).	Barbara Litrell, President (928) 649-0135 blitrell@aol.com Bill Goss bill@billgoss.net Anita Rochelle anitar772002@yahoo.com
Northern Gila County Water Plan Alliance (See the Salt Watershed)				
Oak Creek Canyon Task Force	Oak Creek is a sub-watershed of the Verde River.	Task Force goals: - Conserve natural resources and enhance the environment for wildlife and human uses; - Sustain and improve recreational opportunities; - Improve water quantity and quality; - Reduce damage due to storms, floods, human activities, or natural disasters; and - Engage public and governmental involvement through outreach and education.	2 nd Thursday of the month Sedona	Barry Allen (623) 551-8804 nelsenallan@earthlink.net Morgan Stine morgan@direcway.com
Stoneman Lake Property Owners Association	This closed basin (no outflow from the lake) is a 900 acre lake drainage area, located 40 miles south of Flagstaff.	Mission is to preserve the pristine environment that is Stoneman lake and to foster harmony and cooperation among neighbors to maintain the peace and tranquility so highly valued in the community.	Meeting times and places may vary.	Chris Estes, President (480) 585-5772 cklestes@msn.com Bill McPeters, V. Pres (602) 431-1513 wedigit@juno.com
Verde Watershed Association	Verde Watershed	Goals: - Conserve natural resources and enhance the environment; - Sustain, improve, and diversify recreational opportunities; - Improve water quality and quantity; - Sustain, enhance, and improve the environment for wildlife; - Reduce damage from storms, floods, and human-made activities and/or natural disasters; and - Engage public and governmental involvement through public outreach and education.	3 rd Tuesday of the month Prescott, Cottonwood, Camp Verde (varies)	Robert Hardy (928) 634-5526

(Watershed information obtained from Arizona Dept. of Water Resources 2004)

What Funds are Available to Improve Water Quality?

Numerous funding sources can be used for projects that improve water quality in Arizona. Three of those funds are detailed below.

Water Quality Improvement Grants -- ADEQ distributes grant funds under Section 319(h) of the federal Clean Water Act to both public and private entities within Arizona. These grants are to implement on-the-ground water quality improvement projects that address nonpoint sources of pollution.

Grant applications that contain activities identified in a watershed-based plan (or equivalent plan) are given priority over other projects.

For a grant application to be considered eligible for evaluation, the application must comply with the process described in the current *Water Quality Improvement Grant Program Manual*, and the project description must indicate how all of the following will be accomplished:

- Improve, protect or maintain water quality in a waterbody in Arizona by addressing a nonpoint source of pollution;
- Demonstrate acceptable water quality management principles, sound design, and appropriate procedures;
- Yield benefits to the state at a level commensurate with project costs;
- Have an on-the-ground implementation component within Arizona;
- Provide for at least 40% of the project costs as non-federal match;
- Support the ADEQ, Water Quality Division Mission; and
- Be eligible under applicable state and federal regulations.

The Water Quality Improvement Grant Manual provides details about the grant program and includes the application forms. For more information about the Water Quality Improvement Grant Program or to be added to the mailing list, please contact Jean Ann Rodine, grant coordinator, at (602) 771-4635 or, toll-free in Arizona, (800) 234-5677, Ext. 771-4635, or email at: Rodine.Jean@azdeq.gov. Additional information can also be found on the internet at <http://www.azdeq.gov/environ/water/mgmt/planning>.

Water Protection Funds – In 1994, the Arizona Water Protection Fund was established to implement projects that would maintain, enhance, and restore rivers, streams, and associated riparian resources, including fish and wildlife that are dependent on these habitats. In previous years, the legislature has provided \$5,000,000 annually in grants to fund proactive incentives to implement water quality and water quantity restoration actions. However, in 2003, funding was

limited to \$2,000,000 due to deficits in the state budget.

Any individual, entity, state or federal agency, or political subdivision of Arizona may submit an application to the Arizona Water Protection Fund Commission. For further information, please contact the commission at (602) 417-2400 extension 7016.

Clean Water and Drinking Water Revolving Funds – The Water Infrastructure Finance Authority of Arizona (WIFA) is an independent agency of the state. It is authorized to finance the construction, rehabilitation and/or improvement of drinking water, wastewater, wastewater reclamation, or other water quality facilities/projects. Generally, WIFA offers borrowers below market interest on loans for 100% of eligible project costs from the following funds:

- Clean Water Revolving Fund (CWRF) for eligible publicly-held wastewater facilities,
- Drinking Water Revolving Fund (DWRF) for eligible publicly- and privately-held drinking water systems; and,
- Technical Assistance Program (TAP) Pre-design and design grants and loans for eligible wastewater and drinking water systems.

WIFA also manages a Technical Assistance Program. The program offers pre-design and design grants to eligible wastewater and drinking water systems under 10,001 population. Pre-design and design loans are available to all eligible systems. The purpose of the Technical Assistance Program is to enhance project readiness to proceed with a WIFA project construction loan.

Regional 208 Water Quality Management Planning

Areawide Waste Treatment Management Planning was authorized by the Clean Water Act Section 208 in 1972. It requires regional planning agencies to develop comprehensive water quality management plans. These plans require existing and proposed wastewater treatment facilities to meet the anticipated municipal and industrial waste treatment needs of an area over a 20-year period, as well as provide general planning guidance for nonpoint source, sludge, storm water and other activities. The plans assure attainment of the state's water quality standards.

Currently, the Designated Planning Agencies are: Maricopa Association of Governments (MAG), Pima Association of Governments (PAG), Northern Arizona Council of Governments (NACOG), Central Arizona Association of Governments (CAAG), Southeastern Arizona Governments Organization (SEAGO), and La Paz, Mohave and Yuma Counties.

The Watershed Management Unit’s 208 Program is responsible for three main tasks:

- Conducting 208 Consistency Reviews that assure that the proposed facility or usage will be consistent with the existing Certified Regional Water Quality Management Plan,
- Coordinating water quality management plan amendment approvals, and
- Providing technical support and outreach to regional planning agencies in developing comprehensive Water Quality Management Plans.

This outreach includes participation in the Water Quality Management Working Group bi-monthly meetings. The working group consists of the eight Designated Planning Areas and various state, federal or local entities involved in regulatory water quality planning. They meet bi-monthly to review plan amendments and make recommendations to ADEQ on regulated water quality management issues. ADEQ continues to work with the Designated Planning Areas on incorporating a watershed-based approach to the 208 process. These watershed-based discussions also encourage the Designated Planning Areas to begin focusing more efforts on the nonpoint source side of the program; however, this is a slow process, as water pollution problems often span more than one political jurisdiction.

Putting it all together

The programs described in this chapter function together to improve the quality of Arizona’s water resources. The box below illustrates the water quality improvement process and the parties involved using a demonstration stream. Through this process, ADEQ strives to preserve, protect, and enhance water resources in Arizona by generating credible monitoring data, applying comprehensive assessment methods, developing plans for water quality improvement, and encouraging public involvement in water quality projects and planning.

Example Stream - Babbling Brook

Step#1

Surface Water Monitoring and Standards Program

Establishes water quality standards for Babbling Brook.

Step #2

Field personnel obtain water quality data that is used to assess the biological, chemical, and physical integrity of the stream.

Step #3

Volunteer Monitoring Program

Works with volunteer groups across Arizona to collect data. These data supplement water quality data and information collected by ADEQ and other agencies on Babbling Brook.

Step #4

Watershed Management Unit

Completes state water quality assessment (305b Report) and Babbling Brook is identified as impaired and placed on the 303(d) List of impaired waters for copper and zinc.

Step #5

TMDL Unit

Completes a TMDL study for copper and zinc on Babbling Brook.

Step #6

Watershed Management Unit

Develops a TMDL implementation plan to improve water quality in the stream and identifies an action plan with milestones to be implemented by the stakeholders.

Step #7

Grants and Outreach Unit

The stakeholders within the Babbling Brook watershed apply for a Water Quality Improvement Grant and receive priority because there is a TMDL implementation plan in place.

Step #8

The project(s) is approved and the Grants and Outreach Unit is responsible for managing the project.

Step #9

Volunteer Monitoring Program

Works with project managers or other volunteer groups to collect data. These data help to determine the effectiveness of the management measures that are implemented, as identified in the TMDL implementation plan.

Step #10

Grants and Outreach Unit

The water quality improvement project is completed and the project is closed out.

Step #11

TMDL Unit

The targeted monitoring staff of the TMDL Unit conduct follow-up water quality monitoring. The data indicate that Babbling Brook is meeting water quality standards and the stream is added to the list of “attaining” waters.